Presto Case Study

Summary

igolgi's Presto Transcoder product family provides a break through in operational efficiency for Broadcast Head ends, Edge Deployments, and other workflows. In this case study, we analyze the benefits of deploying igolgi Presto compared to traditional competitive solutions. Each 1U Presto replaces a complete rack of equipment in typical deployments. In addition, the Presto Product provides new functions, greatly increases video quality, and operational efficiency in a variety of ways.

Transcoding and Format Conversion

In Broadcast contribution and distribution workflows, it is common to require transcoding and format conversion throughout the various transmission links. Video content is often distributed internationally from the source location, and must therefore be transcoded to meet the requirements of the end point Broadcast Distributors. Due to differences in national video standards, 50 and 60 Hz baseband signaling formats, and other incompatibilities across borders, each end point can require different audio and video processing functions.

To solve this problem, contribution and distribution companies typically deploy standard Video Decoding, Encoding and other Broadcast Equipment gear in a Serial Fashion for each channel they serve. Each link in the video chain is handled by a serial cascade of functions such as shown in Figure 1 with the following components:

1. Time Delay Insertion. For channels being moved from one time zone to another, it is necessary to delay the signal by a fixed time. Therefore, an international channel will have its programming "on-air" at the same time for all international distribution end points.

2. IRD Receiver. This unit takes IP or ASI input (bitstreams) and performs video and audio decoding. Before decoding, FEC Decoding such as COPv3 is necessary if it was used to protect the packets being delivered via IP/UDP from across the globe. Some packet loss is unavoidable, therefore FEC is typically used. The output is digital or analog uncompressed signals, with SDI interfaces the most common.

3. Format Conversion. This can take several forms of video and audio conversion
    a. 50 Hz to and from 60 Hz Conversion such as PAL to NTSC or NTSC to PAL
    b. Interlaced to de-interlaced
    c. HD to SD
    d. Audio Sampling Rate Conversion

4. Audio Leveling Control. This function provides the ability to adjust the volume of the audio signal which often is too "hot" or loud. This gives Broadcasters the ability to equalize the audio volume across channels for a more uniform channel to channel signal.
5. Encoder + FEC. Finally, video and audio encoding is performed into H.264 or MPEG2 formats, encapsulated into Transport Streams for IP, and COP FEC added for robustness.

As can be seen in Figure 1, to perform all these operations on a single channel, typically requires 5 separate 1U or 2U units. Therefore, a typical full height 40U rack can contain 4-8 channels. Some vendors do offer 2-4 channels per rack component which can help somewhat on the required rack space, however this results in a minimum of 1 channel of processing in 4U space on average, or a maximum of 10 channels per 40 U rack.

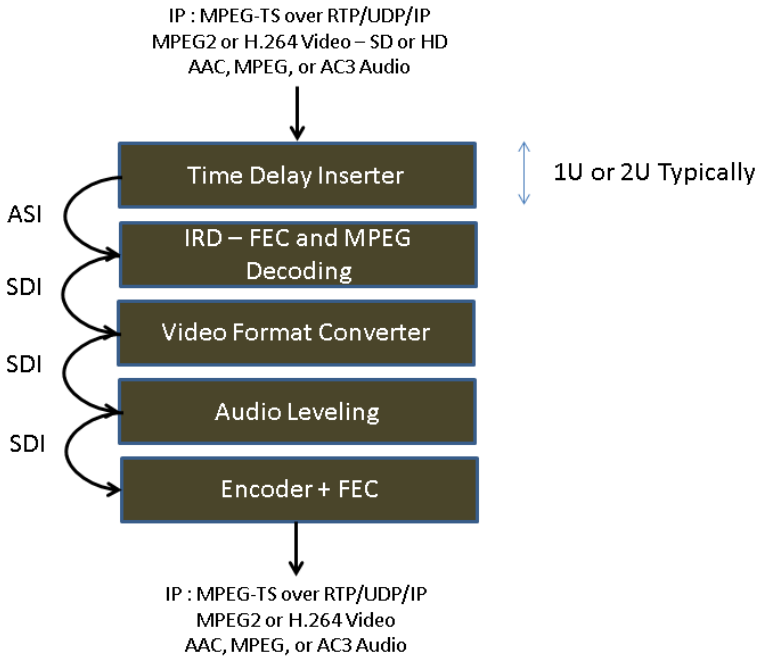

Figure 1 - Typical Signal Flow and Rack Components for 1 Channel

TCO Issues

The total cost of ownership of the legacy system is very high per channel. Due to the single function nature of each unit, a tremendous amount of inefficiency is created:

1. Power Supplies: Each rack unit component has its own power supply, and typically a redundant power supply. This represents a cost of roughly $500 per unit, in addition to wasted power and cooling costs.

2. Interface : Each rack unit must implement industry standard interfaces for interoperability. Therefore, for each single function, additional cost and complexity is created by repeating

interfaces. Even worse, many standard products (designed with hardware platforms) do not allow a la cart interface options, providing them all. This results in a lot of unused interfaces in most installations, generating more wasted cost and power.

3. Cabling between the independent rack units is cumbersome, leads to human error and more time invested for installation, maintenance, and cost of the cables themselves.

4. Management interfaces. With separate rack components, each unit has its own management interface for setup, configuration and monitoring. This requires operators to separately log in and control each unit, or invest in a third party management control solution, and dealing with the overhead of interoperability.

5. Space, Cooling and Power. With independent rack units per function, the overall rack space, required cooling, and total power is high.

igolgi Solution – Presto

igolgi is a technology provider to the video industry. We develop products and technologies for audio and video workflows based on our core technology of audio and video components including MPEG and H.264 video compression codecs. igolgi has designed its own codecs from the ground up to operate at the highest levels of computer efficiency on today's multi-core x86 server platforms. You can read more about igolgi's codec technology at http://www.igolgi.com/white-papers.php.

Presto is igolgi's integrated audio/video transcoder and format converter. It is a fully integrated solution that provides conversion from MPEG2 or H.264 , SD or HD, 50 or 60 HZ input, to MPEG2 or H.264, SD or HD, 50 or 60 Hz outputs. In addition, it integrates a programmable time delay feature, audio volume control (leveling), FEC, and HD to SD conversion. On top of this, the Presto-SD product can provide up to 8 SD channels in a single 1U chassis, while Presto-HD provides 2 HD channels per 1U chassis.

The block diagram for Presto is shown below in Figure 2. The efficiency of an integrated solution like Presto is evident when compared to legacy, traditional single function solutions that are deployed in the industry today.

- Rack Space Efficiency: Presto provides 8 SD channels per 1U rack space, or 2 HD channels. This is a relative space savings of an incredible 40 to 1 for SD, and 10 to 1 for HD. This assumes 1U size for each independent rack unit function in the legacy system, which often are 2U units.

- Interface Efficiency: Presto's integrated solution avoids all the unnecessary I/O interfaces from unit to unit in the legacy system. Presto can support ASI input and output if necessary. In the simplest case of IP input and output, the Presto solution only has an IP connection; while the legacy system additionally has 1 ASI and 3 SDI interfaces. Also, the legacy system typically will have other interfaces that are unused. Igolgi offers IP as the default interface in all its products, with ASI, SDI as a la cart options.

- Cabling: The cabling for the Presto product is a total of 2 Ethernet cables and 2 power cables (for redundant power supply configuration). The legacy system requires 2 Ethernet cables, 1 ASI, and 3 SDI cables, and 10 power cables. In addition, for management functionality in the legacy system, typically another cable is needed for each unit, adding another 5 cable connections.

- Power Efficiency. The Presto SD product consumes approximately 50 Watts per SD channel; whereas the legacy system consumes 400-700 Watts per channel. This is a power savings of 8 to 14 times.

- Management interface. The Presto product is controlled from a simple, intuitive web based interface that allows set up in minutes. Multiple Presto units can be controlled from one web interface. Optionally, SNMP MIBs can be provided if required.

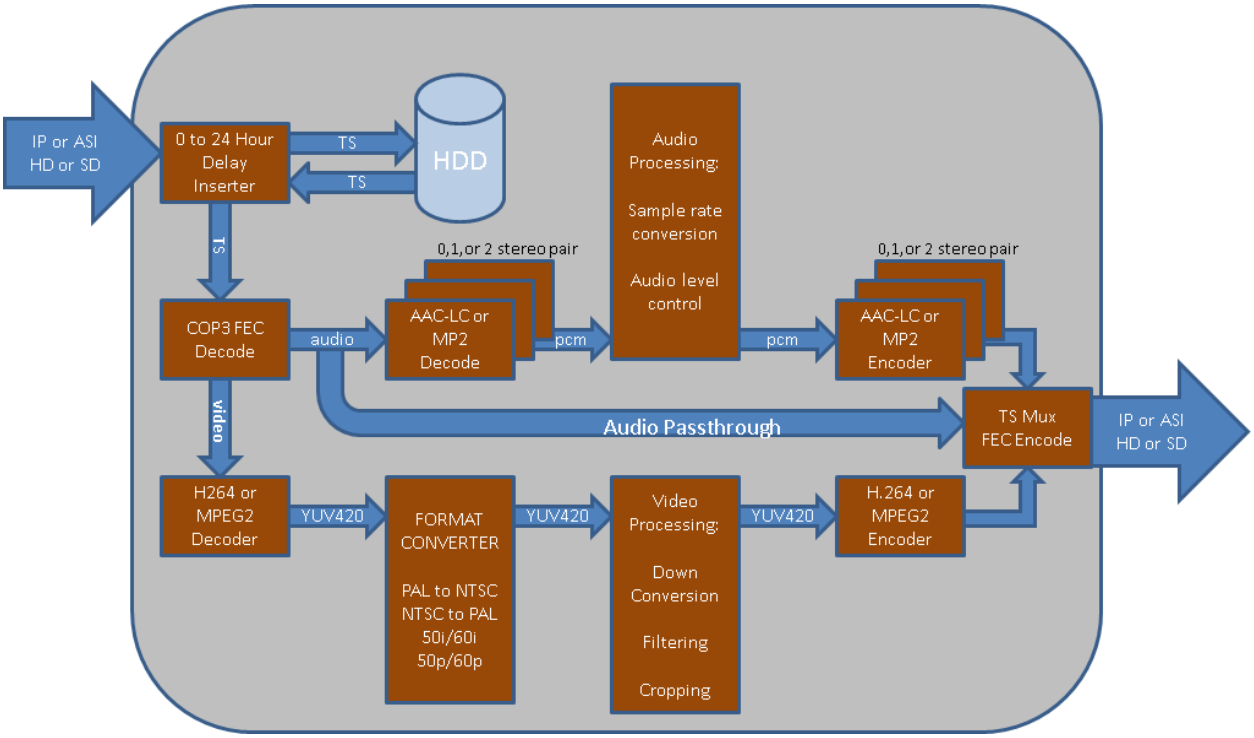

Figure 2 Presto SD or HD Transcoder and Format Converter

Summary of igolgi Presto Competitive Advantage

The TCO for a typical customer is comprised of the following elements:

- Capital Cost of Equipment

- Igolgi provides significant CAPEX cost savings due to the reduction of non-essential I/O interfaces, power supplies, and other hardware components that are not needed, as well as leveraging off the shelf IT Server Components compared to the Legacy solutions which employ costly hardware based platforms.

- Energy Cost (per year): Based on 12 cents a KWH, the igolgi Presto Solution costs $500/year for 8 SD channels versus $3300/year for the legacy solution for 8 SD channels. Over a 5 year period, igolgi Presto saves over $14,000 in Energy Costs.

- Cooling Costs (PU = 2). Based on typical server room configurations with a PU = 2, the cooling cost is approximately equal to the energy cost. Therefore, the igolgi Presto solution saves another $14000 over 5 years for a 8 channel system.

- Based on space leasing costs, the igolgi solution saves approximately $500/year in space costs, or $2500 over 5 years.

- Cabling savings approximately are $1800 for a 8 SD channel system. Igolgi Presto requires 4 cables versus the legacy 168 cables. At a conservative $15 per cable, this results in the savings of $1800. Additional efficiency is gained by not having the overhead and maintenance of 128 cables.

The TCO includes the savings in CAPEX and OPEX. As is mentioned, igolgi's Presto offers considerable savings in CAPEX. **The OPEX savings are significant at $33,523 over 5 years of operation**. Table 1 summarizes the OPEX TCO savings.

Table 1 : igolgi Presto SD OPEX Advantage

	8 SD Channels			
	Legacy	igolgi Presto	igolgi Advantage	
Space (Rack Units)	40U	1U	4000%	
Space Cost	$ 550.00	$ 13.75	$ 536.25	per year
Power (Watts)	3200	500	640%	
Energy Cost	$ 3,363.84	$ 525.60	$ 2,838.24	per year
Cooling Cost	$ 3,363.84	$ 525.60	$ 2,838.24	per year
Cables (number of cables)	168	4	4200%	
Cable Costs	$ 2,520.00	$ 60.00	$ 2,460.00	one time savings
TCO (not including CAPEX savings)	$ 9,797.68	$ 1,124.95	$ 8,672.73	1st year savings
			$ 6,212.73	per year savings
			$ 33,523.65	five year savings

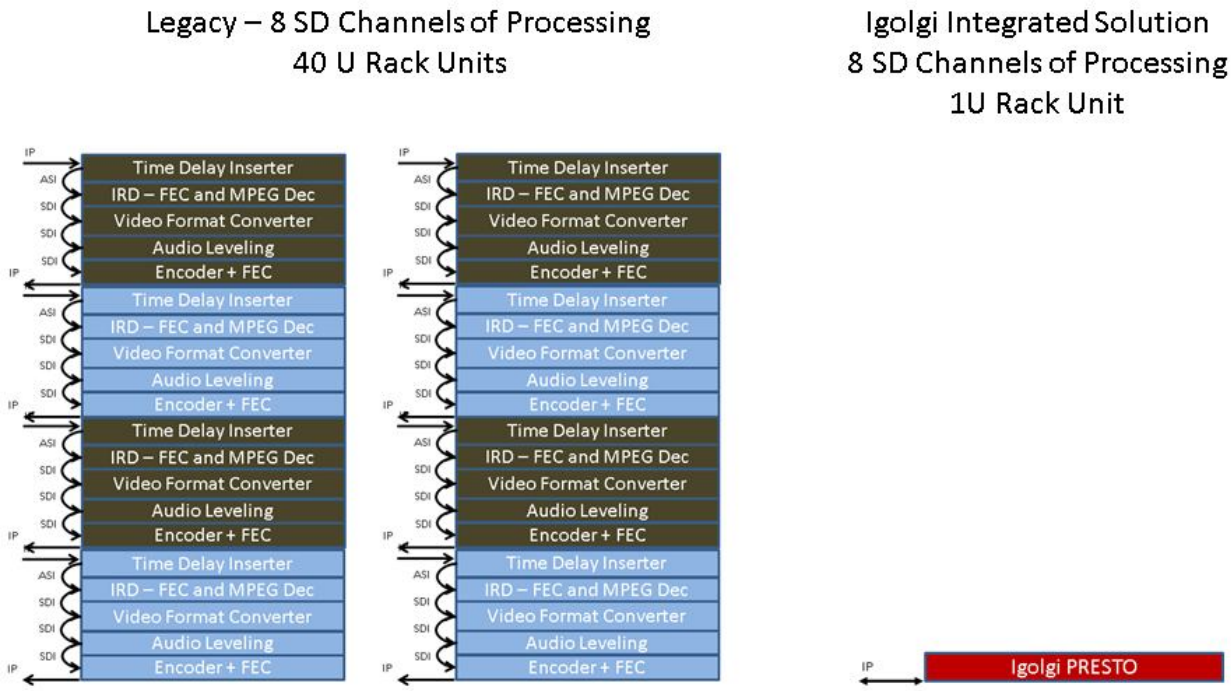

Figure 3 : Comparison of Rack Space for Legacy 8 Channel System vs igolgi Presto

Conclusion

The igolgi Presto Product Family demonstrates the large advantages of software based video workflow solutions. By leveraging igolgi codec parallel technology, igolgi has developed a suite of products from Encoders, Transcoders, HD to SD Transcoders, and Internet Dynamic Streaming solutions, all aimed to provide customers with significant CAPEX and OPEX savings, that literally pays for itself in a few years.

igolgi can tailor any of its products with the features that customers need in their workflow.

Contact igolgi today for a demonstration of our products.

info@igolgi.com